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(54) CONSTRUCTION MACHINE

(57) A construction machine reduced in overall body length without shortening arms of operating units and made suitable for use in limited space without sacrificing its working efficiency, wherein a second operating unit (14) is arranged above a traveling truck (11) so that the bases (14a) of the second operating unit (14) are positioned in areas (1d, 1e) between a tangent (1b) to the swiveling circle (1a) of a first base (13), which is parallel to the widthwise direction of the traveling truck (11), and a straight line (1c) passing the center of the swiveling circle (1a) and parallel to the widthwise direction of the traveling truck (11), in the outside vicinity of the swiveling circle (1a).

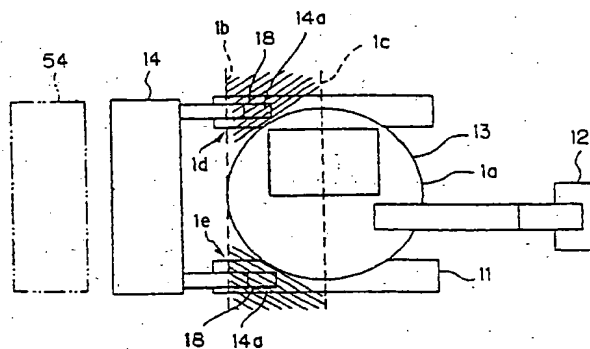


FIG.1(b)

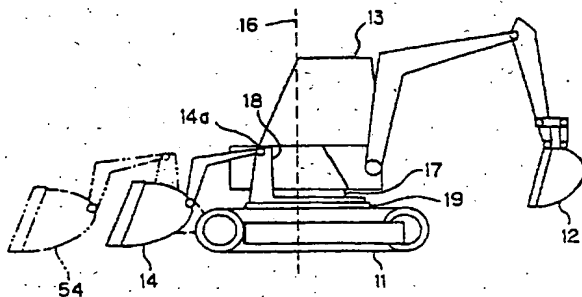


FIG.1(a)

EP 1 008 693 A1

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Description

TECHNICAL FIELD

[0001] The present invention relates to the structure of a construction machine for performing construction work, and the like, by means of a first operating unit and a second operating unit, which travels by means of a traveling truck.

BACKGROUND ART

[0002] Figs. 4(a), (b) illustrate a construction machine for performing construction work equipped with a first and a second operating unit, where Fig. 4(a) is a plan view and Fig. 4(b) is a side view.

[0003] As illustrated in Figs. 4(a) and (b), this construction machine is provided with a back hoe 52, which is an excavating and earth-moving tool, in the rear area of the traveling truck 51, and a loader 54 which is a loading tool, in the front area of the traveling truck 51. The back hoe 52 is supported by a first base platform 53, such that it is capable of upward and downward movement, and the first base platform 53 is capable of rotating 360° in a horizontal direction by turning within the range of the circle 55 indicated by the broken line in the diagram, when the back hoe 52 is in a retracted state. Moreover, the back hoe 52 is an excavating tool consisting of an excavating bucket and a multiple-jointed arm. On the other hand, the loader 54 is a loading tool consisting of arms and a bucket installed at the end of these arms, the bases of the loader 54 being installed on attachment members 58, such that it is capable of upward and downward movement.

[0004] The first base platform 53 supporting the back hoe 52 is fixed to a rotating unit 56, and is capable of rotating about an axis of rotation 57. Furthermore, the loader 54 is installed on the attachment members 58 in such a manner that it does not interfere with the first base platform 53, when the first base platform 53 rotates.

[0005] In this way, in a conventional construction machine, since the bases of the loader 54 are positioned in front of the swiveling circle 55 of the first base platform 53, the overall length of the machine is increased, thereby making the machine unsuitable for use in restricted spaces.

[0006] Here, if the overall length of the machine is shortened by reducing the length of the arm of the loader 54, then the loader 54 will not be capable of a large reach, and hence it will not be able to provide a broad operating range. In other words, a new problem will arise in that working efficiency will decline.

DISCLOSURE OF THE INVENTION

[0007] The present invention was devised with the foregoing in view, an object thereof being to provide a

construction machine whereby the overall length of the machine can be shortened compared to a conventional construction machine, in such a manner that the machine is suitable for use in restricted spaces, whilst making it possible to achieve a broad operating range and to increase working efficiency.

[0008] In order to achieve the aforementioned objects, the present invention is a construction machine wherein a first base platform supporting a first operating unit is provided rotatably in a horizontal direction on an upper portion of a traveling truck, and a second operating unit is also provided on the upper portion of the traveling truck, characterized in that:

the second operating unit is installed on the upper part of the traveling truck in such a manner that bases of the second operating unit are located within areas in an outer vicinity of a swiveling circle of the first base platform, extending between a tangent to the swiveling circle running in parallel with a widthwise direction of the traveling truck and a straight line passing through a center of the swiveling circle and running in parallel with the widthwise direction of the traveling truck.

[0009] Therefore, according to the present invention, as shown in Fig. 1(a) and (b), a second operating unit 14 is installed on the upper part of a traveling truck 11 in such a manner that the bases 14a of the second operating unit 14 are positioned within areas 1d, 1e (diagonally shaded areas) in the vicinity of the swiveling circle 1a of the first base platform 13, to the outside thereof, extending between a tangent 1b to the swiveling circle 1a running in parallel to the widthwise direction of the traveling truck 11 and a straight line 1c passing through the center of the swiveling circle 1a and running in parallel with the widthwise direction of the traveling truck 11. As a result of this, the position of the second operating unit 14 can be moved further towards the inner portion of the vehicle compared to the position of a conventional second operating unit 15 (as depicted by the broken lines), and hence the overall vehicle length can be reduced without shortening the arms of the second operating unit 14.

[0010] Consequently, the construction machine according to the present invention has a shorter overall vehicle length than a conventional construction machine, and it is therefore suitable for use in restricted spaces. Moreover, since it is not necessary to reduce the length of the arms of the second operating unit 14, the second operating unit 14 is able to provide a large reach, thereby improving working efficiency.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011]

Fig. 1(a) is a side view of a first embodiment of the

present invention; and Fig. 1(b) is a plan view of this first embodiment;

Fig. 2(a) is a side view of a second embodiment of the present invention, and Fig. 2(b) is a plan view of this second embodiment;

Fig. 3 is a plan view of a third embodiment of the present invention;

Fig. 4(a) is a plan view of a conventional construction machine, and Fig. 4(b) is a side view of this conventional construction machine;

Fig. 5 is a diagram showing a desirable embodiment with regard to the height of the cab; and

Fig. 6 is a principal oblique view illustrating a case where a foot rest is provided in the cab of the embodiment illustrated in Fig. 5.

BEST MODE FOR CARRYING OUT THE INVENTION

[0012] Below, embodiments of the present invention are described with reference to the drawings.

[0013] Fig. 1(a) is a side view of a construction machine according to an embodiment of the present invention, and Fig. 1(b) is a plan view of same.

[0014] As these diagrams illustrate, traveling truck 11 is a vehicle having a travelling function, which, for example, uses a caterpillar tread system, as shown in the drawings. Moreover, the vehicle may also be based on a wheel system, as illustrated in Fig. 4(a) and (b). The present embodiment is based on the presumption of a construction machine having an ultra-small swiveling circle, wherein the swiveling circle 1a of the first base platform 13 is restricted within the width of the traveling truck 11.

[0015] Moreover, the first base platform 13 is a cab in which an operator rides.

[0016] A rotating unit 17 which rotates freely through 360° in a horizontal direction about a rotational axis 16 is installed on the upper part of the traveling truck 11, and the first base platform 13 is fixed to this rotating unit 17. A back hoe 12 forming a first operating unit is supported on the end portion of this base platform 13. Therefore, by operating the rotating unit 17 appropriately, the back hoe 12 can be positioned in any chosen direction in the horizontal plane.

[0017] Moreover, a loader 14, forming a second operating unit is also installed on the upper part of the traveling truck 11. The bases of this loader 14 are supported by attachment members 18 provided on the side faces of the first base platform 13. The attachment members 18 are fixed to a frame 19 positioned below the first base platform 13, and this frame 19 is fixed to the traveling truck 11.

[0018] Here, the positional relationship between the loader 14 and the first base platform 13 will be described.

[0019] In particular, as illustrated in Fig. 1(b), the loader 14 is installed on the attachment members 18 on the upper part of the traveling truck 11 in such a manner

that the bases 14a, which are the sections where the loader 14 is connected to the attachment members 18, are located within areas 1d, 1e (indicated by diagonal shading) which lie in the vicinity of the swiveling circle 1a of the first base platform 13, to the outside thereof, extending between tangent 1b of the aforementioned swiveling circle 1a running in parallel with the widthwise direction of the traveling truck 11, and straight line 1c passing through the center of the aforementioned swiveling circle 1a and also running in parallel with the widthwise direction of the traveling truck 11.

[0020] In the present embodiment, the bases 14a of the loader 14 are attached to attachment members 18 which are separate items from the frame 19, but it is also possible for the bases 14a of the loader 14 to be attached to attachment members formed integrally with the frame 19. In short, the bases 14a of the loader 14 should be attached to attachment members extending from a frame 19 provided between the traveling truck 11 and the first base platform 13.

[0021] Moreover, the bases 14a of the loader 14 may also be installed on attachment members extending from the traveling truck 11, without providing a frame 19 between the traveling truck 11 and the first base platform 13. In this case also, the attachment members may be formed independently from the traveling truck 11, or they may be formed integrally with the traveling truck 11.

[0022] Here, the loader 14 forming the second operating unit may be installed in such a manner that it can rotate freely in a horizontal direction.

[0023] Fig. 2(a) is a side view of an embodiment wherein a loader 14 is capable of rotating, and Fig. 2(b) is a plan view of same. Similar labels to Figs. 1(a) and (b) indicate the same parts.

[0024] As these diagrams show, a rotating unit 27 which is capable of rotating freely through 360° in a horizontal direction about an axis of rotation 26 is installed on the upper part of a traveling truck 11, and a frame 28 is fixed to this rotating unit 27. Attachment members 29 for supporting the bases 14a of the loader 14 are installed on the aforementioned frame 28. Consequently, by operating the rotating unit 27 as necessary, it is possible to position the loader 14 in any direction in the horizontal plane. In this case, the frame 28 which supports the loader 14 by means of the attachment members 29 functions as a second base platform about which the loader 14 rotates.

[0025] In this embodiment, the bases 14a of the loader 14 are installed on attachment members 29 which are formed as independent units from the frame 28 representing the second base platform, but the bases 14a of the loader 14 may also be installed on attachment members which are formed integrally with the frame 28 representing the second base platform. In short, provided that the bases 14a of the loader 14 are installed on attachment members extending from the frame 28 forming the second base platform, the attachment members may be fabricated integrally with, or inde-

tively.

[0054] Moreover, in the present embodiment, it is presumed that the operating units are a loader 14 and a back hoe 12, but it is also possible to adopt embodiments wherein these are replaced by other appropriate types of operating unit, depending on the tasks to be performed.

[0055] For example, a vertically movable excavating blade may be provided in place of the vertically movable loader 14.

[0056] Moreover, in the present embodiment, a first operating unit 12 is provided, rotatably in a horizontal direction, on the upper part of a second operating unit 14 which is also rotatable in a horizontal direction, but the present invention is not limited to this, and other types of operating unit may also be provided, rotatably in a horizontal direction, on the upper part of the first operating unit 12, in accordance with the tasks to be performed.

Claims

1. A construction machine wherein a first base platform supporting a first operating unit is provided rotatably in a horizontal direction on an upper portion of a traveling truck, and a second operating unit is also provided on the upper portion of the traveling truck, characterized in that:

the second operating unit is installed on the upper part of the traveling truck in such a manner that bases of the second operating unit are located within areas in an outer vicinity of a swiveling circle of the first base platform, extending between a tangent to the swiveling circle running in parallel with a widthwise direction of the traveling truck and a straight line passing through a center of the swiveling circle and running in parallel with the widthwise direction of the traveling truck.

2. The construction machine according to claim 1, wherein the bases of the second operating unit are installed on attachment members extending from the traveling truck.
3. The construction machine according to claim 1, wherein the bases of the second operating unit are installed on attachment members extending from a frame provided between the traveling truck and the first base platform.
4. The construction machine according to claim 1, wherein a second base platform supporting the second operating unit is provided rotatably in a horizontal direction, below the first base platform, the bases of the second operating unit being installed on attachment members extending from the second

base platform.

5. The construction machine according to claim 4, wherein the second base platform is provided below the first base platform, in such a manner that a rotational axis of the second base platform is virtually coaxial with a rotational axis of the first base platform.
6. The construction machine according to claim 1, wherein the swiveling circle of the first base platform is restricted within the width of the traveling truck.
7. The construction machine according to claim 1, wherein a circle described by the rotation of a portion of the first base platform on an opposite side to the portion thereof where the first operating unit is attached is restricted within the width of the traveling truck.
8. The construction machine according to claim 1, wherein the first base platform is a cab in which an operator rides, the bases of the second operating unit being installed on a frame covering lower sides of this cab.
9. A construction machine wherein a cab in which an operator rides is installed on an upper portion of a traveling truck, attachment members on which bases of an operating unit are installed being provided between the cab and the traveling truck, in positions in a vicinity of a swiveling circle of the cab, to an outside thereof, and tasks being carried out by means of the cab rotating relatively with respect to the attachment members, characterized in that:

the cab is installed on the upper portion of the traveling truck in such a manner that a floor surface of the cab is higher than upper ends of the attachment members.
10. The construction machine according to claim 9, wherein the operating unit carries out tasks by means of arms rotating about rotational fulcrums formed at positions where the bases are attached to the attachment members.
11. The construction machine according to claim 8, wherein a footrest extending outside a floor surface of the cab is provided in a position above the attachment members when the cab performs relative rotation, in such a manner that it does not interfere with the operating unit.

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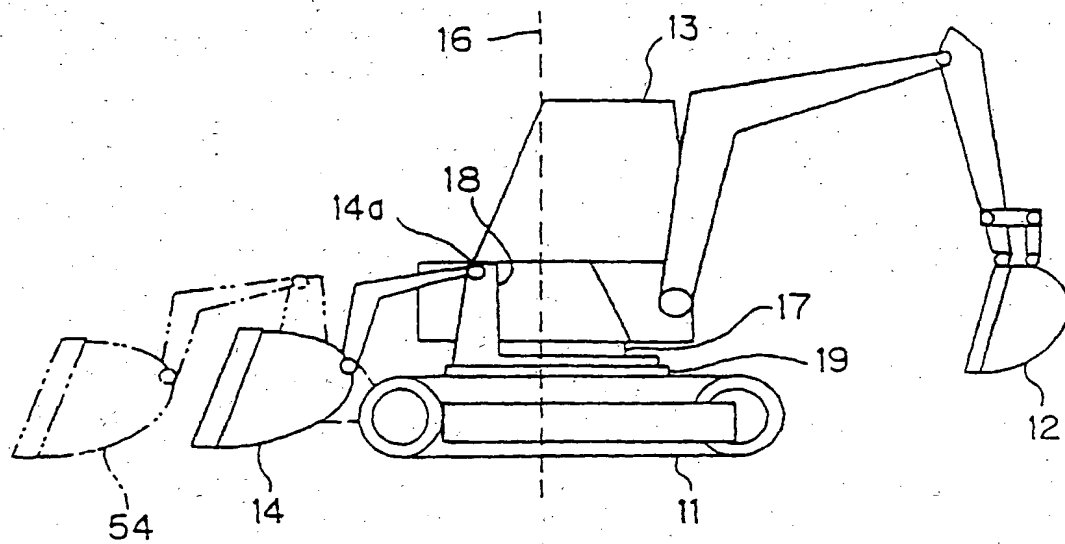


FIG. 1(a)

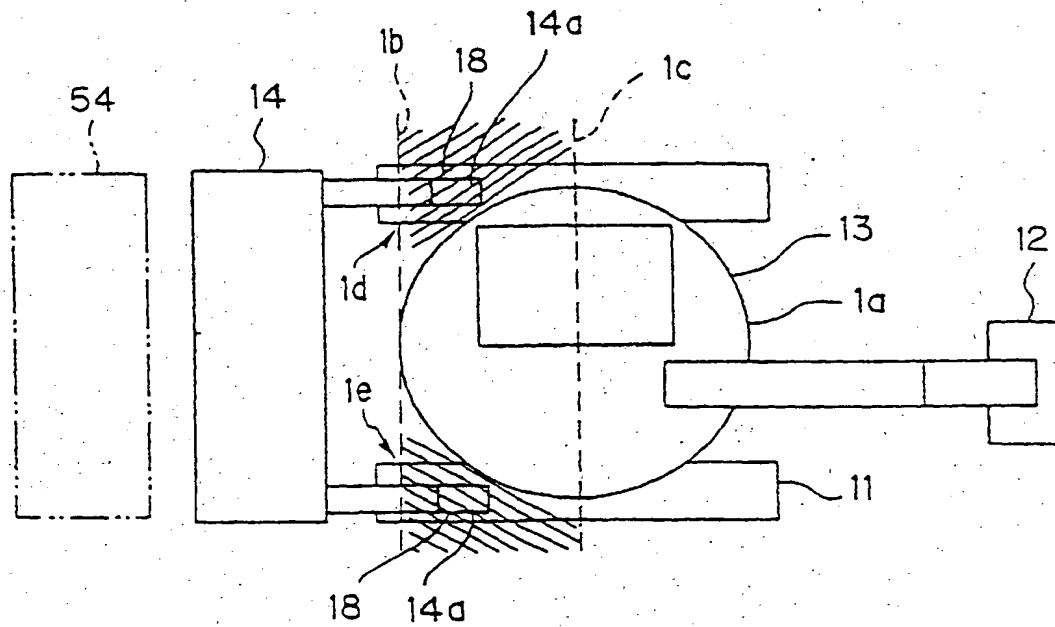


FIG. 1(b)

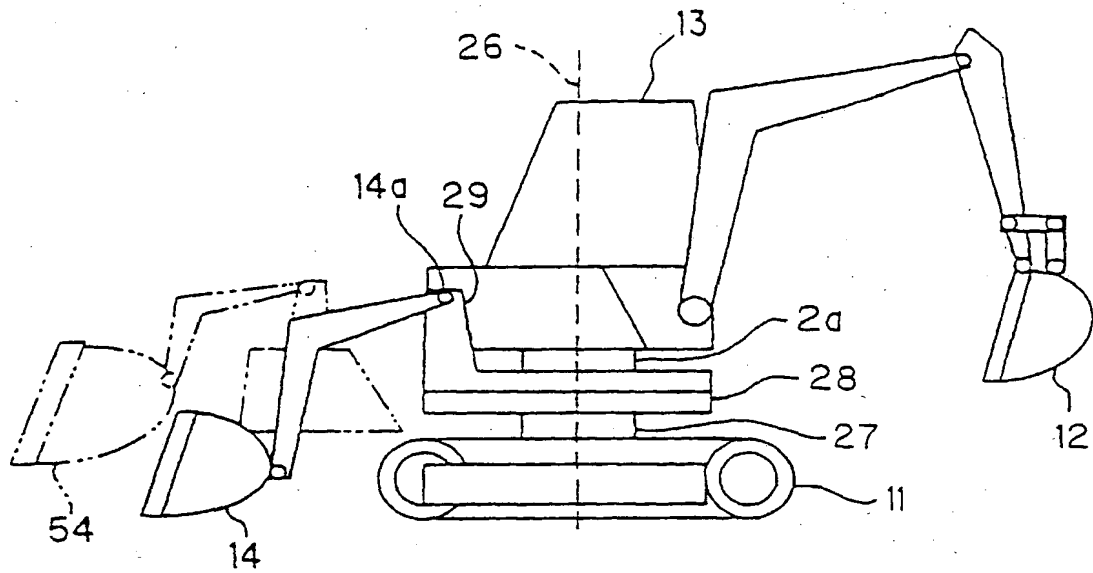


FIG. 2(a)

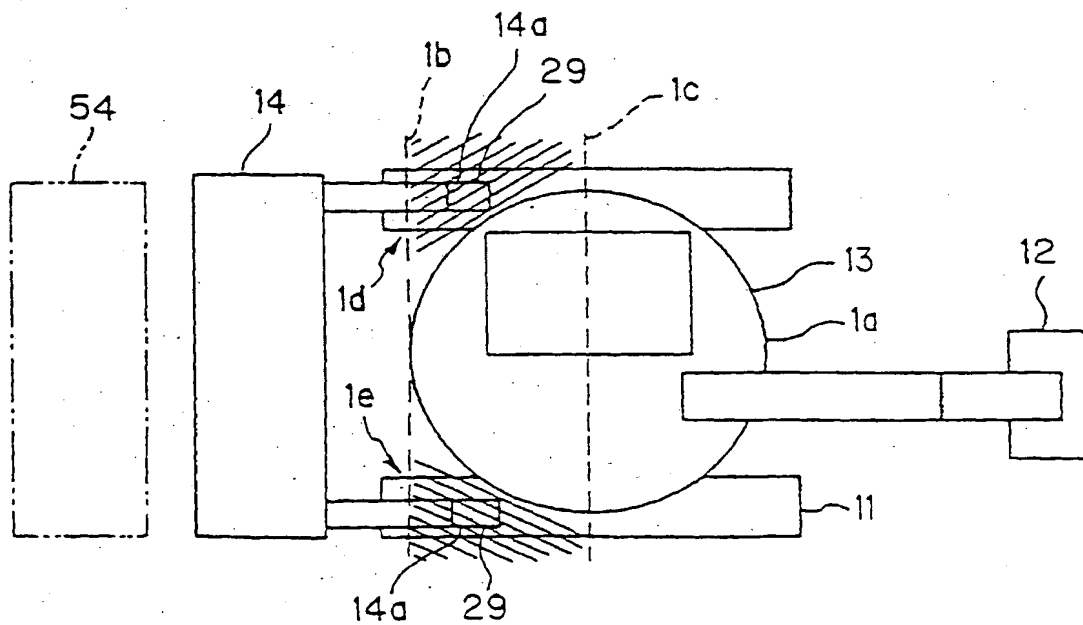


FIG. 2(b)

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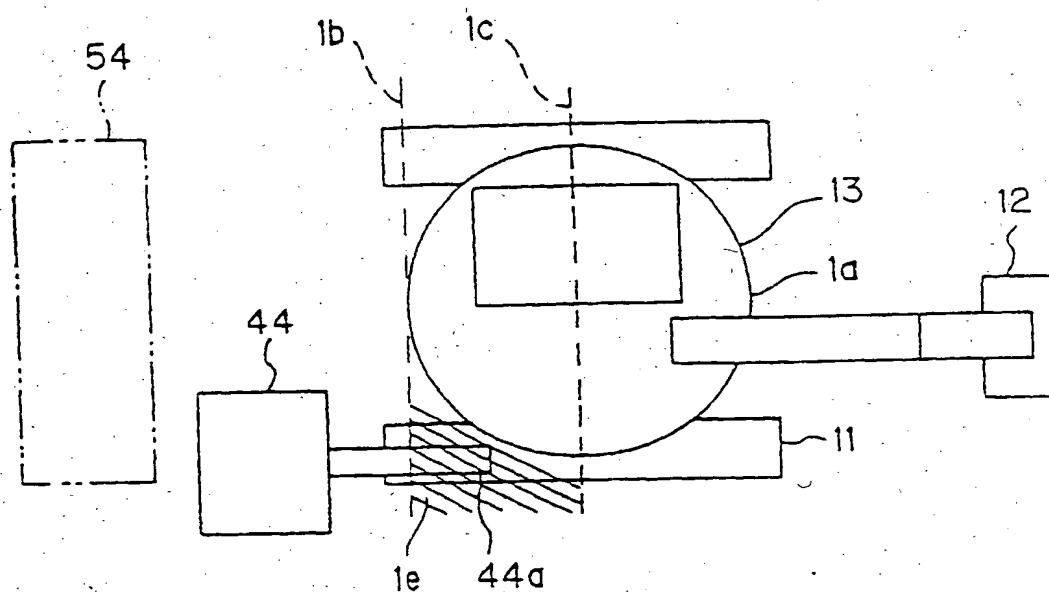


FIG.3

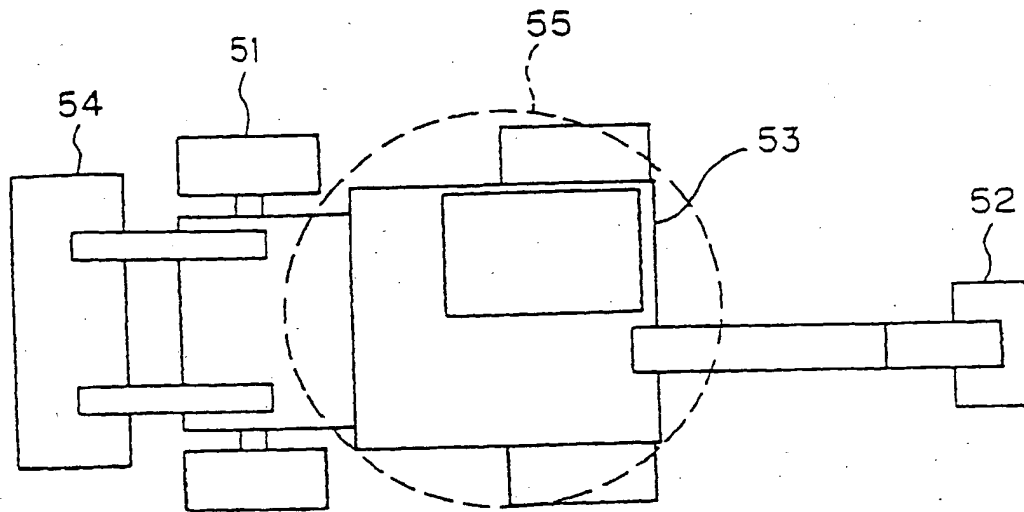


FIG. 4(a)

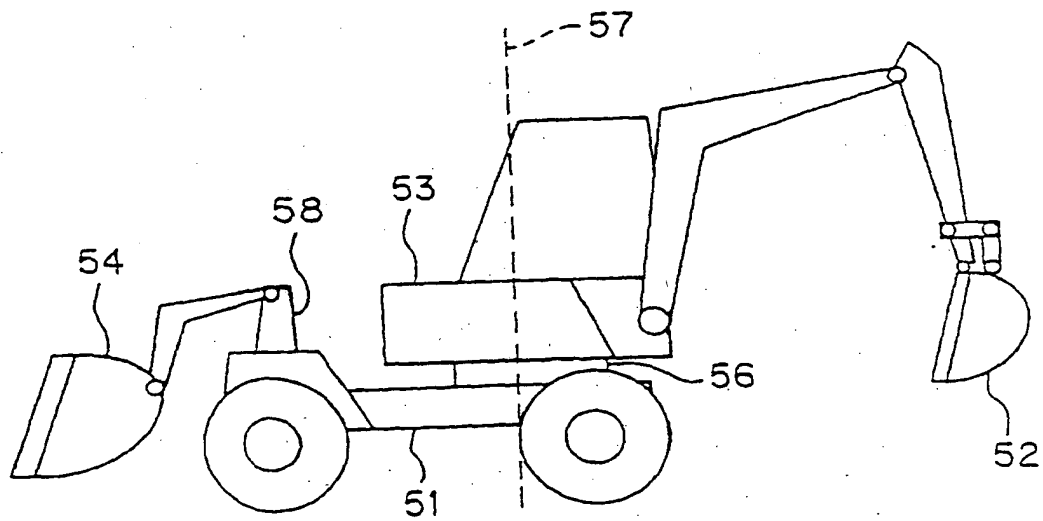


FIG. 4(b)

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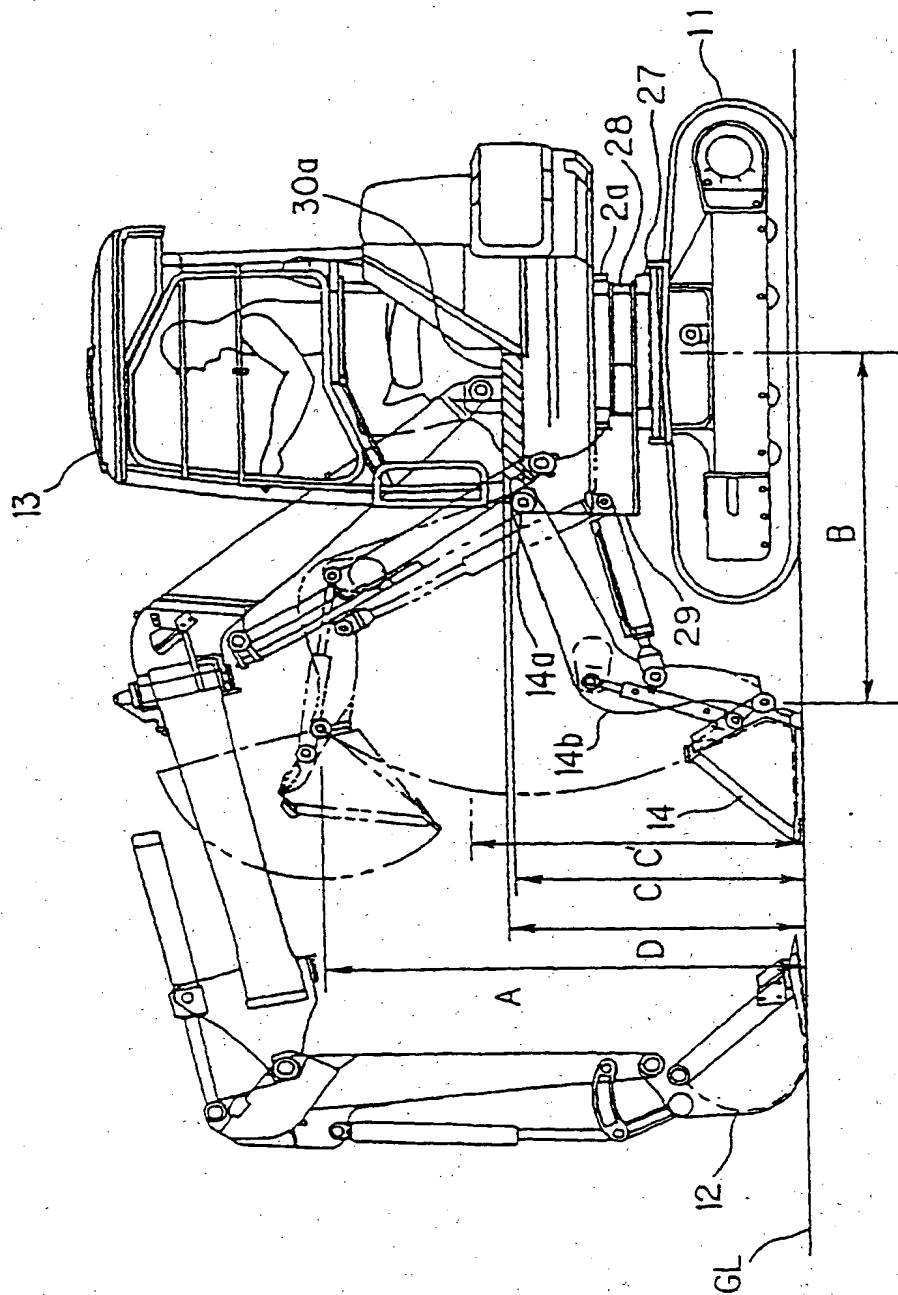


FIG.5

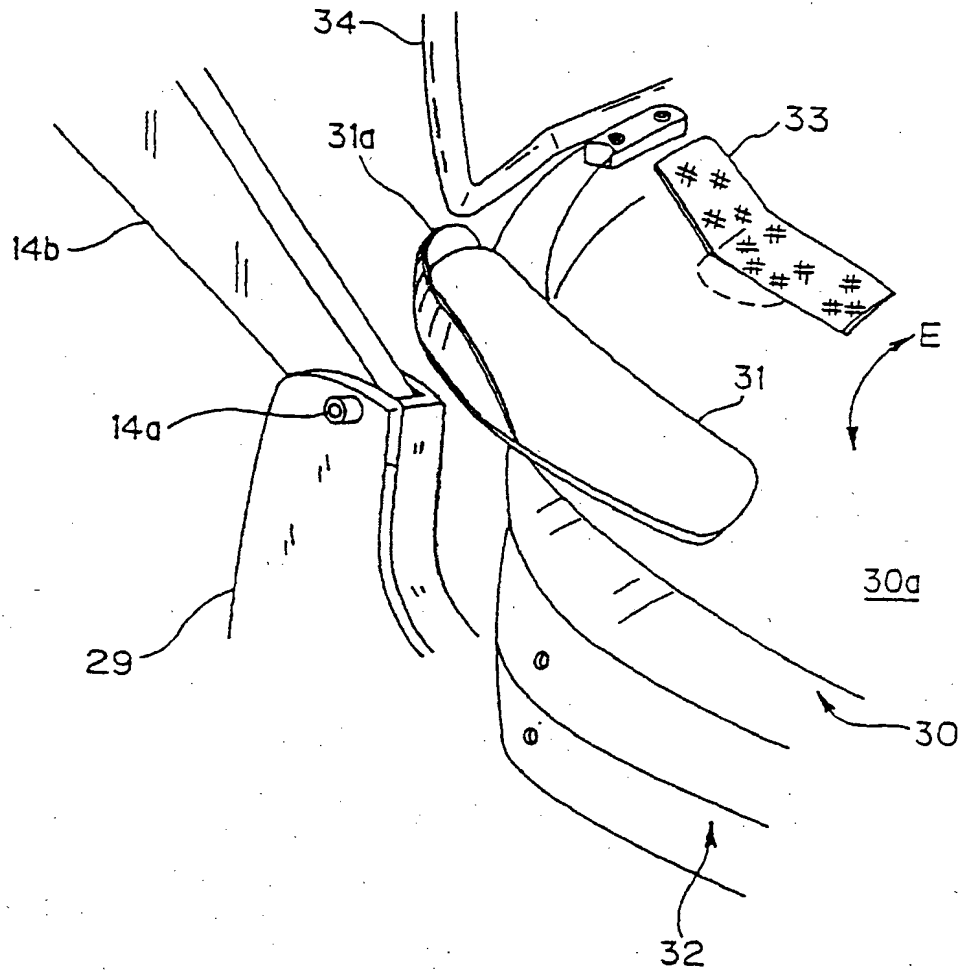


FIG.6

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP98/02047

A. CLASSIFICATION OF SUBJECT MATTER
Int.Cl.⁶ E02F3/96, E02F9/16

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHEDMinimum documentation searched (classification system followed by classification symbols)
Int.Cl.⁶ E02F3/96, E02F9/16Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Jitsuyo Shinan Koho 1926-1996 Toroku Jitsuyo Shinan Koho 1994-1998
Kokai Jitsuyo Shinan Koho 1971-1998 Jitsuyo Shinan Toroku Koho 1996-1998

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT.

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP, 50-12882, Y (S.A. Poclain), April 21, 1975 (21. 04. 75) (Family: none)	1-11

☐ Further documents are listed in the continuation of Box C.☐ See patent family annex.

* Special categories of cited documents:

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Date of the actual completion of the international search
August 4, 1998 (04. 08. 98)Date of mailing of the international search report
August 11, 1998 (11. 08. 98)Name and mailing address of the ISA/
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